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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,246	10/28/2003	Joerg Bischoff	509982005700	7040

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EXAMINER	
NGUYEN, SANG H	
ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/696,246	BISCHOFF ET AL.	
	Examiner	Art Unit	
	Sang Nguyen	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,10,13,14,22 and 25* is/are rejected.

7)☒ Claim(s) *3-9,11,12,15-21,23 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's response to amendment on 07/11/05 has been entered. It is noted that the application contains claims 1-25 by the amendment on 07/11/05.

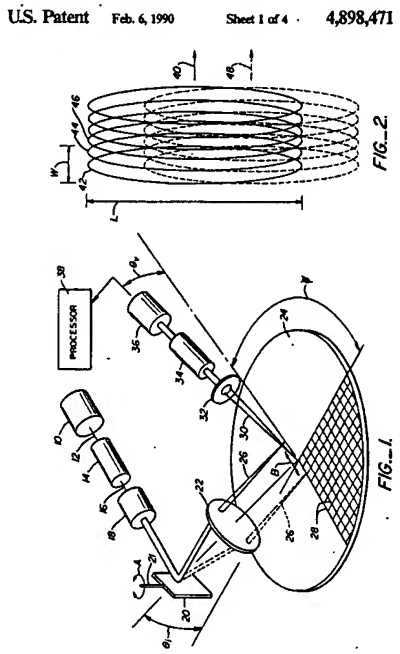
Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Stonestrom et al (U.S. Patent No. 4,898,471).

Regarding claims 1 and 13; Stonestrom et al discloses a system and method for examining a three dimensional structure formed on the semiconductor wafer, comprising:

- a laser source (10 of figure 1) for directing an incidence beam (26 of figure 1) to the structure considered to be a periodic pattern formed thereon a plurality of die with rectangular grid of street between die (28 of figure 1 and col.4 lines 34-36) of the semiconductor wafer (24 of figure 1) at an incidence angle (θi of figure 1) and an azimuth angle (Ψ of figure 1), wherein the incident beam (26 of figure 1) is scanned over a range of azimuth angles by to obtain an azimuthal scan (col.3 lines 50-51 and col.5 lines 7-35 and figure 2); and
- a detector (36 of figure 1 or 96 of figure 6A) for detecting the cross polarization components (34 of figure 1) of diffracted beams (89 of figure 6A) during the azimuthal scan. See figures 1-7B.



Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stonestrom et al (U.S. Patent No. 4,898,471) in view of Hayashi (U.S. Patent No. 4837603).

Regarding claims 2 and 14; Stonestrom et al discloses all of features of claimed invention as indicate polarized of the incident beam (26 of figure 1) has angle at polarization angle of 5 degrees or 20 degrees (col.4 lines 24-30) except for the incident beam is polarized at a polarization angle of zero or 90 degrees. However, Hayashi teaches that it is known in the art to provide a correction azimuth angle of the photometric ellipsometers comprising the incident beam is polarized at a polarization angle of zero or 90 degrees by a polarizer (2 of figure 1) and analyzer (4 of figure 1 and col.2 lines 45-46) . It would have been obvious to one having ordinary skill in the art at the time the invention was made modify a system and method for examining a three dimensional structure formed on the semiconductor wafer of Stonestrom et al with the incident beam is polarized at a polarization angle of zero or 90 degrees as taught by Hayashi for the purpose of correcting or canceling the errors in the azimuth angle by measured higher accuracy with ellipsometric parameters.

Claims 10, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stonestrom et al (U.S. Patent No. 4,898,471)in view of Sezginer et al (U.S. Patent No. 6,819,426).

Regarding claims 10, 22, and 25; Stonestrom et al discloses all of features of claimed invention as **indicated in claims 1 and 13**, except for the rotation of the structure is determined based on the azimuthal scan. However, Sezginer et al teaches that it is known in the art to provide the rotation of the structure (32 of figure 4) of the test pattern (10 of figure 4) is determined based on the azimuthal scan (col.9 lines 55-60 and col.18 lines 7-26). It would have been obvious to one having ordinary skill in the art at the time the invention was made modify a system and method for examining a three dimensional structure formed on the semiconductor wafer of Stonestrom et al with the rotation of the structure is determined based on the azimuthal scan as taught by Sezginer et al for the purpose of controlling accurately the azimuth angle to reduce sensitivity parameters other than overlay error.

Allowable Subject Matter

Claims 3-9, 11-12, 15-21, and 23-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of *a zero azimuth position is determined based on the azimuthal scan, wherein the cross polarization components are zero at the zero azimuth position* in set forth limitation of claims 3 and 15.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of *detecting azimuthal misalignment of the measured diffraction signal to a simulated diffraction signal based on the determined zero azimuth position* in set forth limitation of claims 5 and 17.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of *the three dimensional structure is a contact hole array, wherein a contact hole array is determined to be asymmetric based on the azimuthal scan* in set forth limitation of claims 7 and 19.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of *the rotation of the structure is determined when the cross polarization reach a minimum but are not zero and the cross polarization terms are not symmetric about the minimum* in set forth limitation of claims 11 and 23.

Response to Arguments

Applicant's arguments filed 07/11/05 have been fully considered but they are not persuasive. Stonestrom et al does not teach or suggest "the incident beam is scanned

over a range of azimuth angles to obtain an azimuthal scan of the structure" as recited in claims 1 and 13.

This argument is not persuasive. Applicant does not show the different structures and purposes between a range of azimuth angles as disclosed by Applicant's present invention and Stonestrom et al's a range of azimuth angles of a particle detection on pattern wafers, since all the features of a range of azimuth angles of a particle detection on pattern wafers recited in the in the Stonestrom et al reference and Applicant's Present Invention's have the same functions for scanning or rotating the structure of wafers during illuminating light beam to the structure of wafer to detecting the scattered light from wafer at constant spatial interval.. Also, the rapplicant argues that Stonestrom et al does not teach or suggest "the incident beam is scanned over a range of azimuth angles to obtain an azimuthal scan of the structure". As stated in previous Office action, a laser source (10 of figure 1) for directing an incidence beam (26 of figure 1) to the structure considered to be a periodic pattern formed thereon a plurality of die with rectangular grid of street between die (28 of figure 1 and col.4 lines 34-36) of the semiconductor wafer (24 of figure 1) at an incidence angle (θi of figure 1) and an azimuth angle (Ψ of figure 1), wherein the incident beam (26 of figure 1) is scanned over a range of azimuth angles by to obtain an azimuthal scan (col.3 lines 50-51 and col.5 lines 7-35 and figure 2); and a detector (36 of figure 1 or 96 of figure 6A) for detecting the cross polarization components (34 of figure 1) of diffracted beams (89 of figure 6A) during the azimuthal scan. See figures 1-7B.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stover et al (6486946) discloses method for discriminating between holes in and particles on a film covering a substrate.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SN

Sang Nguyen

September 13, 2005

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19 Sept 05